



What NASA's Report Said About Toyota Sudden Acceleration

Posted by Brett Emison
Wednesday, February 09, 2011 11:12 AM EST

Most news outlets are reporting only the headline from the NHTSA/NASA report on Toyota sudden acceleration, but not the details. You can read my early takes on the sudden acceleration report [here](#) and [here](#).

Read the [NHTSA/NASA Sudden Acceleration Executive Summary](#)

Read the [NHTSA/NASA Full Report](#)

Despite the popular headline, the report actually found evidence that electronic sources of sudden acceleration are possible and can happen. "NASA's study confirmed that there is theoretical possibility that two faults could combine under very specific conditions to affect the ETC systems to as to create an unintended UA." (Full Report, p. vii).

Unlike Secretary LaHood's boisterous comments, NASA's engineers were more guarded in describing their findings [via [LA Times](#) and [SRS](#)]:

"Our detailed study can't say it's impossible...." "Due to system complexity ... and the many possible electronic software and hardware systems interactions, *it is not realistic to prove that the ETCSi cannot cause UAs....* Therefore, *absence of proof that the ETCSi caused a UA does not vindicate the system.*"

Other NASA Findings:

- O-2 When the brake can override the throttle command it provides a broad defense against unintended engine power whether caused by electronic, software, or mechanical failures. (Full Report, p. 60-61)
- O-5 Vehicles that are operated with an active pedal sensor fault, either with the MIL on or off, may be susceptible to the effects of second faults, leading to possible unintended accelerations (Full Report, p. 61)
- O-7 There are no methods for capturing pre-event software states and performance following a UA event either on the vehicle or as a diagnostic tool. (Full Report, p. 61)
- O-8 The available incident reporting databases are valuable for identifying potential vehicle symptoms related to UA events. However, voluntary reporting systems may not allow for accurate quantitative

- estimates of incident rates or statistical trends. (Full Report, p. 61)
- O-9 A review of HF literature related to UAs indicates that pedal misapplication remains an identified cause of some UAs. However, it is not possible to accurately estimate from available survey and laboratory data how frequently this error is an underlying cause. (Full Report, p. 61)
 - O-11 Design features, such as a sport shifter and push button stop, might compromise the driver's ability to recover from a UA event. Such features may be indicative of broader driver-vehicle integration issues and therefore may merit further consideration. (Full Report, p. 62).

NASA also found -- contrary to Toyota's assertions -- failures that mimic valid accelerator pedal signals can be induced to produce large throttle openings. (Full Report, p. 63). NASA also found that "certain resistive faults can result from the presence of tin whiskers within the accelerator pedal position sensor. (Full Report, p. 63).

NASA's Executive Summary also identified the following failure modes:

Failure mode when combined with driver input can cause the throttle to jump 15 degrees in certain conditions and may not generate an error code to document or trace the error.

Multiple failure modes that can result in throttle openings of less than 5 degrees resulting in high idle speed, hesitation, and surging.

These findings are significant because Toyota has consistently maintained that not fault could occur without triggering an error code to document the malfunction. NASA has shown otherwise.

NASA also endorsed a [brake override](#) ("smart brake) system to protect against sudden unintended acceleration regardless of the cause:

NHTSA will consider initiating rulemakings on brake override systems, keyless ignition systems, and event data recorders. Brake override systems may prevent or mitigate some UA incidents by ensuring that, when the brake is applied, the braking system has priority over the throttle. NASA observes in its report (Observation O-2) that such a system "provides a broad overarching defense against unintended engine power" from a wide range of causes. (Full Report, p. ix)

Brake override systems have been used by auto makers for at least a decade. Back in November 2009, I wrote that **Toyota should have installed brake override systems** on all of its vehicles. In January 2010, I documented that **Toyota could have installed brake override systems for less than \$1.00 per vehicle.** Toyota has only now begun installing this critical safety device in its vehicles.

The NHTSA/NASA report did little to address issues documented by drivers who actually experienced an unexplained sudden unintended acceleration event.

From the [Los Angeles Times](#):

"It doesn't resolve my concerns," said Jeffrey Pepsi, a suburban Minneapolis financial consultant who complained to NHTSA after his Lexus ES suddenly accelerated on a Twin Cities freeway. During the 2007 incident, which occurred long before sudden acceleration became a national buzzword, Pepsi said he put his foot under the gas pedal and attempted to

lift it, eliminating the possibility of pedal entrapment or a sticky pedal.

"Just because they couldn't reproduce the problem doesn't mean it didn't happen," Pepski said.

"All it means is that they couldn't reproduce it. I stand by my story."

Similarly, NASA's findings do not solve the question of what caused Kevin Haggerty's well documented sudden acceleration event. Haggerty owned a 2007 Toyota Avalon that experienced at least 5 different sudden acceleration events. Haggerty did not have accessory floor mats and his OEM mats were secured in place. Sticky pedals couldn't have caused the problem because he didn't have his foot on the pedal. On Haggerty's final incident, he was actually able to drive the vehicle while the engine was racing out of control into his local Toyota dealership.

He got to the parking lot, shifted to neutral and stopped the car with its brake smoking and engine racing out of control. He got out of the car and the engine was still racing (no pedal misapplication) Service technicians were able to look at he car and confirm the unintended acceleration was not caused by floor mats, sticking pedals or driver error. They also confirmed no computer error codes (meaning the computer was not detecting whatever was causing the problem).

The report also sheds light on the [failure of NHTSA to adequately ensure the safety of vehicles](#) on our highways. As [The New York Times editorialized](#), the report "doesn't dispel concerns about the weakness of the nation's safety regulation." The NYT described the "frailty of a safety system that relies on an underfinanced regulator that has an enforcement budget of about \$18 million and can only impose puny fines with little deterrent power." Improving federal vehicle safety requirements requires an Act of Congress. Last year, some members pushed passage of the Motor Vehicle Safety Act that would have added much needed safety improvements. However the auto safety bill died in the Senate after substantial opposition by auto makers and the hold of a single Senator.

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